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Advances in the study of the spider fauna of ex-USSR

Kirill G. MIKHAILOV
Zoological Museum of the Moscow State University, Herzen Street 6, K-9,
Moscow, 103009 Russia.

Advances in the study of the spider fauna of ex-USSR. - An updated catalogue of spiders of ex-USSR is compared with some earlier calculations of 1989. Up-to-date, 2672 spider species belonging to 470 genera and 49 families are reported from the ex-USSR territories. The main increase in species number since 1989 is found consecutively in Linyphiidae, Salticidae, Dysderidae, Gnaphosidae, Thomisidae, Lycosidae, and Clubionidae. Spider faunas of the ex-Soviet republics as much as of main physiographical regions are viewed. Areas of the most abundant spider diversity are consequently Russian Plain (1001 species), Caucasus (748), montaneous Middle Asia (706), mountains of South Siberia (700), Urals (689), Middle Siberia (568), and continental Far East (506). A large percentage of Linyphiidae is found in boreal areas, whereas Salticidae is mostly abundant in southern montaneous and desert areas.

Key-words: spiders – the ex-USSR territories – the ex-Soviet republics – fauna – catalogue

The results presented here are deriving from the compilation of a spider catalogue of USSR. The project was started in 1981, first preliminary data have been calculated in 1989, but were published only in part (Mikhailov 1992). A updated revised check-list is prepared for publication in "*Arthropoda Selecta*", and will be included in the book "Spiders of the ex-USSR territories: short catalogue and bibliography" to appear in 1996.

Aim of this project is the compilation of literature data. The bibliographical index comprises ca. 1.000 citations since the 18th century till 1995. A card catalogue of regional data is complete, but publication of all materials (comparable in volume with P. Bonnet's "Bibliographia araneorum") remains impossible due to a lot of technical reasons.

On the basis of my research, three periods in Russian/Soviet arachnological studies can be established:

- 18th century – 1860s: data accumulation,
- 1870s – 1967: descriptive faunistics,
- 1968 – until now: descriptive taxonomic period.

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A fourth, analytical period is still under way.

The first period started with the so-called Academician expeditions for the study of Russian nature (1760s–1770s), but only a handful of spider species were found, and most of the identifications remain doubtful. Scarce indications of spiders are dispersed among voluminous naturalists' books.

Arachnological papers as such appeared later, in 1870s, the highest number of faunistical articles having been published in 1910s–1920s. The main result of the second period is Charitonov's bilingual German-Russian catalogue (CHARITONOV 1932, 1936).

The third period started with three identification books (AZHEGANOVA 1968; UTOCHKIN 1968; TYSHCHENKO 1971). In 1980s, the number of faunistical and taxonomical papers was increased crucially and resulted in a new journal, "*Arthropoda Selecta*" launched in 1992.

Main results of spider study in Russia and other ex-USSR territories given hereinafter are arranged by the ex-Soviet republics, and then by physiographical areas (Tables 1–4, Maps 1–2).

TABLE 1

Generic/species composition of spider families known from the ex-USSR territories in 1995 (comparative data of 1989 are given in brackets)

Family	Number of genera		*Number of species*	
Atypidae	1	(1)	4	(2)
Ctenizidae	2	(2)	3	(3)
Dipluridae	1	(1)	1	(1)
Nemesiidae	2	(3)	11	(10)
Filistatidae	4	(1)	7	(6)
Sicariidae	1	(1)	1	(1)
Scytodidae	2	(1)	5	(2)
Leptonetidae	1	(0)	1	(0)
Pholcidae	5	(5)	16	(15)
Segestriidae	1	(1)	4	(4)
Dysderidae	6	(4)	92	(51)
Oonopidae	2	(2)	3	(2)
Palpimanidae	1	(1)	3	(3)
Mimetidae	2	(2)	6	(6)
Eresidae	2	(2)	2	(2)
Oecobiidae	4	(5)	7	(8)
Hersiliidae	1	(1)	3	(3)
Uloboridae	4	(4)	6	(6)
Nesticidae	3	(3)	14	(10)
Theridiidae	17	(17)	124	(116)
Theridiosomatidae	1	(1)	2	(2)
Linyphiidae	211	(153)	864	(654)
Tetragnathidae	7	(8)	45	(30)
Araneidae	18	(12)	112	(114)
Lycosidae	18	(14)	234	(210)
Pisauridae	3	(3)	13	(12)
Agelenidae	7	(4)	47	(44)

Cybaeidae	1	(1)	7	(3)
Argyronetidae	1	(1)	1	(1)
Desidae	1	(1)	6	(3)
Hahniidae	5	(4)	16	(10)
Dictynidae	14	(8)	52	(49)
Amaurobiidae	3	(2)	11	(9)
Titanoecidae	2	(2)	14	(13)
Zoropsidae	1	(1)	1	(1)
Oxyoidae	1	(1)	7	(6)
Anyphaenidae	3	(2)	5	(5)
Liocranidae	7	(4)	25	(19)
Clubionidae	2	(3)	104	(83)
Corinnidae	3	(4)	4	(5)
Zodariidae	3	(3)	22	(23)
Cithaeronidae	1	(0)	1	(0)
Prodidomidae	1	(1)	1	(1)
Gnaphosidae	28	(23)	245	(206)
Zoridae	1	(1)	7	(6)
Heteropodidae	3	(3)	5	(5)
Philodromidae	6	(4)	70	(61)
Thomisidae	17	(17)	172	(146)
Salticidae	39	(38)	267	(211)
TOTALLY 49 families	470	(375)	2672	(2184)

TABLE 2.

Generic/species composition of main spider families at the ex-USSR territories (in %)

No Family	*% of genera*	*% of species*
1 Linyphiidae	45.0	32.4
2 Salticidae	8.3	10.0
3 Gnaphosidae	5.8	9.1
4 Lycosidae	3.8	8.8
5 Thomisidae	3.6	6.4
6 Theridiidae	3.6	4.6
7 Araneidae	3.8	4.2
8 Clubionidae	0.4	3.9
9 Dysderidae	1.3	3.4
10 Philodromidae	1.3	2.6
11 Dictynidae	3.0	1.8
12 Agelenidae	1.5	1.8
13 Tetragnathidae	1.5	1.7

Up-to-date, 2672 spider species belonging to 470 genera and 49 families are reported from the ex-USSR territories (Table 1). Since the 1989 evaluation, the main increase of species composition is recorded in Linyphiidae (+210 species), then successively in Salticidae (+55), Dysderidae (+41), Gnaphosidae (+39), Thomisidae (+26), Lycosidae (+24), and Clubionidae (+21). Two families, Leptonetidae and Cithaeronidae, are found in the ex-USSR territories in 1990s. It is possible to estimate now the volume of the total ex-USSR spider fauna to 3400–3500 species. These data are surpassing considerably my own earlier evaluation to 2700–3000 species

(MIKHAILOV 1992) and very close to calculations of Chinese spider fauna (ca. 3500 species – Song Daxiang, pers. comm.).

Linyphiidae shows the highest diversity in species and genera in ex-USSR (Table 2). Such enlarged share of linyphiids can be explained by the boreal position of the majority of ex-USSR areas, where this family is extremely diverse.

Analysis of spider faunas of the ex-Soviet republics (Table 3) indicates that Russia has the highest diversity, followed by Ukraine, Kazakhstan, and Azerbaijan. Faunas of Lithuania (with a surprisingly small part of linyphiids), Moldavia, and especially Armenia (with a large percentage of linyphiids, displacements in lycosids etc.) are not sufficiently studied.

TABLE 3

Species composition of seven main spider families at the ex-Soviet republics (in %)

Republic	Li	Sa	Gn	Ly	To	Te	Ar	Total (Species/ Families)
Russia	38.5	8.7	8.1	8.9	5.8	5.4	4.5	1822/37
Estonia	40.0	6.5	6.9	9.3	4.8	7.3	5.7	505/25
Latvia	35.7	7.8	8.6	10.9	4.8	7.6	7.3	397/20
Lithuania	19.7	5.5	8.0	16.0	6.7	5.9	10.9	241/21
Byelorussia	36.7	6.4	6.2	9.7	5.6	7.7	7.4	393/26
Ukraine	27.6	8.7	9.3	9.1	5.7	7.6	5.9	816/37
Moldavia	19.4	7.3	6.9	10.7	11.1	7.3	7.6	289/29
Georgia	22.4	4.6	4.9	8.0	8.3	6.4	9.2	327/35
Azerbaijan	16.1	13.2	10.2	8.6	7.3	7.7	6.3	509/35
Armenia	31.4	7.6	8.5	3.4	9.3	2.5	6.8	118/19
Kazakhstan	18.6	15.6	14.0	9.5	9.5	4.4	6.6	621/31
Uzbekistan	8.9	11.4	12.2	10.0	11.1	6.4	8.2	281/33
Turkmenia	10.0	15.7	16.3	7.1	8.6	4.7	6.5	339/38
Kirghizia	28.6	16.5	8.7	4.0	8.4	4.3	9.2	347/29
Tadjikistan	9.7	16.7	8.9	10.8	10.0	6.3	6.3	269/33

Abbreviations: Li – Linyphiidae, Sa – Salticidae, Gn – Gnaphosidae, Ly – Lycosidae, To – Thomisidae, Te – Theridiidae, Ar – Araneidae.

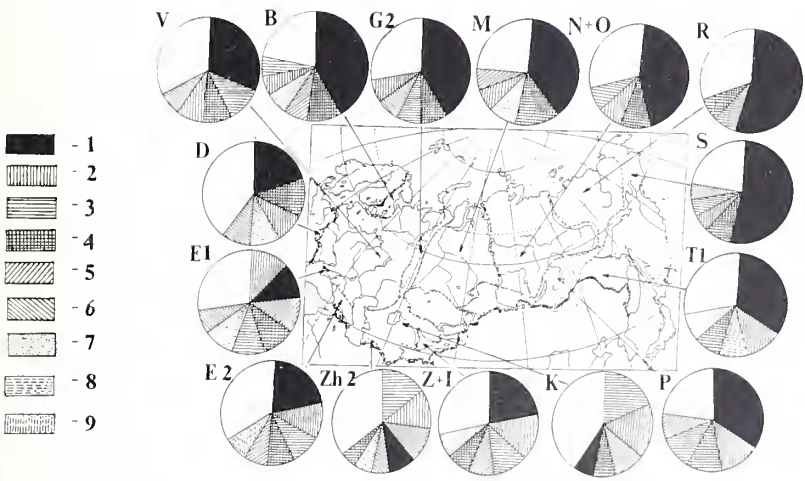
Among the 20 physiographical areas of ex-USSR established by GVOZDETSKY (1968) (Map 1), some are insufficiently explored (Zh1 – 126, L – 127 species), one possesses a poor fauna (G1 – 21 species) (Table 4). Areas of the most diverse spider faunas are successively the Russian Plain, the Caucasus (without Armenian upland), the montaneous Middle Asia, the mountains of South Siberia, Urals, Middle Siberia, and continental Far East. Main increase of species number during the last six years is recorded from the mountains of South Siberia (+264 species), the Far North-East, the W-Siberian Plain, and NE-Siberia (+195, +170, and +105 species, respectively).

Analysis of relative diversity of main spider families in physiographical area (Map 2) indicates the large part of linyphiids in boreal zone (B, G2, M, N + O, R, S), whereas Salticidae prefers southern montaneous and desert regions (Zh2, Z + I, K, P). High percentages of Clubionidae and Dysderidae in T1 and E2, respectively indicate certain centres of diversity of these families in those territories.

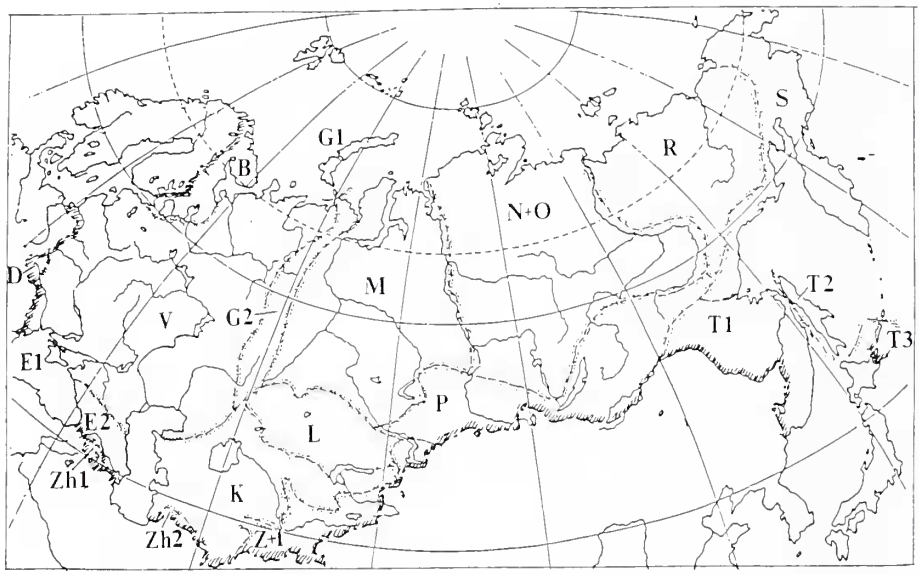
TABLE 4

Spider families/species composition in physiographical areas of ex-USSR in 1995 (comparative data of 1989 are given in brackets; areas are arranged after GVOZDETSKY 1968, with some changes)

Code	Area	Number of families	Number of species
B	Fennoscandia	25 (23)	423 (385)
V	Russian Plain	35 (36)	1001 (936)
G1	Novaya Zemlya	4	21
G2	Urals	24	689
G1 + G2		(25)	(600)
D	Carpathians	34 (35)	426 (435)
E1	Crimea	31 (31)	302 (308)
E2	Caucasus	40	748
Zh1	Armenian upland	19	126
E2 + Zh1		(40)	(671)
Zh2	Kopetdagh Mts.	37	214
Z + I	montaneous Middle Asia	38	706
Zh2 + Z + I		(42)	(650)
K	Middle Asian deserts	34 (37)	291 (291)
L	Kazakhstanian hills	18 (15)	127 (103)
M	W-Siberian Plain	21 (21)	413 (243)
N + O	Middle Siberia	22 (24)	568 (532)
P	mountains of S-Siberia	24 (23)	700 (436)
R	NE-Siberia	16 (16)	382 (277)
S	Far North-East	18 (16)	473 (278)
T1	continental Far East	24	506
T2	Saghalien	20	322
T3	S-Kuriles	18	142
T1 + T2 + T3		(25)	(375)



MAP 2. Contribution in species diversity of main spider families in some physiographical areas of ex-USSR. Abbreviations: 1 – Linyphiidae, 2 – Salticidae, 3 – Gnaphosidae, 4 – Lycosidae, 5 – Thomisidae, 6 – Theridiidae, 7 – Araneidae, 8 – Clubionidae, 9 – Dysderidae, others as in Map 1.



MAP 1

Physiographical areas of the ex-USSR territories (after GVOZDETSKY 1968, changed). Abbreviations: B – Fennoscandia, D. – Carpathians, E1 – Crimea, E2 – Caucasus, G1 – Novaya Zemlya, G2 – Urals, K – Middle Asian deserts, L – Kazakhstanian hills, M – W-Siberian Plain, N + O – Middle Siberia, P – mountains of South Siberia, R – NE-Siberia, S – Far North-East, T1 – continental Far East, T2 – Saghalien, T3 – S-Kuriles, V – Russian Plain, Zh1 – Armenian upland, Zh2 – Kopetdagh Mts., Z + 1 – montaneous Middle Asia.

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Vorläufige Beobachtungen zur Tag- und Nacht-Bewegungsaktivität der epigäischen Weberknechte (Opiliones, Arachnida) aus verschiedenartigen Habitaten im Vitoscha-Gebirge (Nordteil), SW-Bulgarien

Plamen MITOV
Department of Zoology and Anthropology, Faculty of Biology, University of Sofia, 8 Dragan Zankov Blvd., 1421 Sofia, Bulgaria.

Preliminary observations on diurnal locomotory activity of the epigeic harvestmen (Opiliones, Arachnida) in contrasted habitats of Vitosha Mountain (Northern part), SW Bulgaria. - In the present work the data from the investigations of the diurnal locomotory activity of 8 species Opiliones in the area of Vitosha Mt. are analysed. The material was collected with pitfall traps, situated near a river, in a forest and on a meadow, with a collecting period of 4 hours. Following these data, the species *Phalangium opilio* L., 1758, *Lophopilio palpinalis* (Herbst, 1799), *Opilio ruzickai* Šilhavý, 1938 are active by day and night, and the species *Paranemastoma radewi* (Roewer, 1926), *Rilaena balcanica* Šilhavý, 1965, *Lacinius horridus* (Panzer, 1794), *Lacinius dentiger* (C.L. Koch, 1848) and *Zacheus crista* (Brullé, 1832) are recognized as nocturnal.

Key-words: harvestmen - Opiliones - diurnal locomotory activity - Bulgaria

EINLEITUNG

Die Tag- und Nacht-Bewegungsaktivität der Weberknechte ist unzureichend erforscht. Angaben darüber gibt es in den Werken von Pickard-Cambridge (1890), Stipperger (1928), Kaestner (1931), Todd (1949), Pabst (1953), Immel (1954), Pfeifer (1956), Šilhavy (1956), Williams (1962), Phillipson (1960), Edgar & Yuan (1968), Staręga (1976*a*, *b*), Martens (1978), Cloudsley-Thompson (1978), Hillyard & Sankey (1989), Mitov (1993). Nur Staręga (1976*b*) gibt fragmentarische Daten aus Bulgarien zum Thema an. Der vorliegende Artikel presentiert die ersten speziellen Forschungen in dieser Hinsicht in Bulgarien.

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